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SENATE

STUDY

OF THE

SHORTAGE AND SALARIES OF SCIENTISTS AND ENGINEERS

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UNITED STATES SENATE,
COMMITTEE ON POST OFFICE AND CIVIL SERVICE,
August 18, 1953.

Hon. PHILIP YOUNG,
Chairman, United States Civil Service Commission,
Washington 25, D. C.

DEAR MR. YOUNG: In the past several months my attention has been concentrated, both from personal experience and letters received in my office, to the widespread basic salary difference between Government and private-industry employees as relates to positions which require previous knowledge and training requisite to the performance of their duties.

It is apparent that in recruiting certain classification of personnel, such as engineers, scientists, and many others, the Government is jeopardized by their basic salaries, and cannot, in certain geographic areas, adequately compete with private industry.

Therefore, I should like to request that you prepare and furnish to me early in December 1953, if possible, a comparable categorical study and report on such positions as their base salaries compare with those in private industry, along with your recommendations of the classes of positions, methods, and basic salaries needed.

I shall appreciate your contacting the staff of the Committee in working out the necessary details in connection with the furnishing of this report.

With best regards, I am,
Sincerely yours,

FRANK CARLSON,
Chairman, Post Office and Civil Service Committee.

LETTER OF SUBMITTAL

UNITED STATES CIVIL SERVICE COMMISSION,
Washington 25, D. C., January 6, 1954.

Hon. FRANK CARLSON,
Chairman, Committee on Post Office and Civil Service,
United States Senate, Washington 25, D. C.

DEAR SENATOR CARLSON: In further reply to your letter of August 18, 1953, requesting certain information on salaries of scientists and engineers, we are submitting our report, Shortage and Salaries of Scientists and Engineers. Several conferences in connection with the preparation of the report were held by representatives of the Commission with Mr. Robert Johnson, chief counsel of the committee.

All available pertinent information concerning the shortage and salaries of scientists and engineers was reviewed for the purposes of the study. Professional societies and officials in Government departments concerned with the hiring of scientists and engineers were contacted for whatever informational leads they had to offer.

The report contains information secured from a number of different sources. Surveys made and used in the report have different bases, both in coverage and in time factors. Consequently, cross comparisons of information from different studies and surveys cannot be made with any assurance that the data are comparable. However, each source has contributed to an understanding of the problem and of the relationships which exist between the salaries of scientists and engineers in Government and those working for other types of employers.

It is evident from the report that the beginning salaries of scientists and engineers in the Federal Government have fallen behind salaries in private industry for such employees in 1952 and 1953.

It is our opinion, however, that salary changes, if any, for this group should only be considered as part of a general review of pay schedules under the Classification Act of 1949, as amended. Only in this manner is it possible to maintain the basic principle of the Classification Act, which is that equal pay shall be given for substantially equal work.

Sincerely yours,

PHILIP YOUNG, *Chairman.*

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STUDY OF THE SHORTAGE AND SALARIES OF SCIENTISTS AND ENGINEERS

Shortage of Scientists and Engineers

In considering the shortage of scientists and engineers, it is well to realize that manpower shortages are not limited to these fields. As stated by the National Manpower Council:[1]

> Other current shortages have a longer history. For some years the demand for nurses has exceeded the supply. For a decade there have been shortages of qualified teachers. Rural communities have long been handicapped by shortages of doctors, and listings of unfilled positions for psychiatrists and other physicians in State hospitals have become fixed items in the medical journals. The scarcity of competent administrators has long been a cause of special concern to government and business.

Without going into all facets of the problem of the shortage of scientists and engineers, information presenting the shortage condition in 1953 is clearly indicated by quotations from four different sources.

The National Manpower Council research staff cities as obvious evidence of the shortage of engineers that, in spite of intense efforts, employers are finding it impossible to hire as many engineers as they want.

> Almost every newspaper in the country has been carrying columns of want ads directed particularly toward engineers and scientists of every level of competence, from the recent graduate to the mature person with wide experience. The columns of the professional journals duplicate this. The employment services of a number of professional societies have far more requests for men, especially in physics and chemistry, than they have men available. * * * College campuses have been overrun during the last 2 years by company representatives seeking employees. * * * Each concern is trying to reach young men scheduled to graduate at the end of the term before some other corporation hires them.
>
> In * * * 1951, the Engineering Manpower Commission reported that its annual survey showed an estimated immediate demand for 80,000 new engineering graduates and a supply of only 38,000. The survey also estimated that some 15,000 engineers would be absorbed by the Armed Forces during the following year. About half of the new graduates were eligible for the draft or were in the Reserves and, therefore, subject to call. On the basis of this data, the commission estimated a shortage of 57,000 engineers. The commission's 1952 survey showed a demand for at least 40,000 additional new engineering graduates compared with a supply of 30,000. * * * The available data pointed to an estimated shortage at the close of 1952 of approximately 25,000 engineers.
>
> * * * graduating classes [engineering] rose spectacularly to a high of about 52,000 in 1950. The number of graduates fell to about 40,000 in 1951 and to 30,000 in 1952. * * * The decline in the supply of engineers since 1950, however, seems certain to be temporary. The proportion of college students studying engineering is increasing. * * * In the fall of 1951 * * * engineering freshman enrollment rose about 15 percent over 1950. In the fall of 1952, * * * freshman engineering enrollment rose about 30 percent. * * * Because of these recent increases in the numbers beginning engineering training, the upward trend in the supply of new engineers will probably be resumed after graduating classes reach a low of about 20,000 in 1954.

[1] A Policy for Scientific and Professional Manpower, Columbia University Press, New York, 1953.

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* * * estimates of the present number of physicists in the country range from 15,000 to 20,000. * * * Between 1900 and 1950, slightly more than 3,500 doctoral degrees in physics were awarded. During the first 2 decades of the century, the annual number of degrees awarded averaged about 20. Around 1930, the annual number had risen to nearly 100. * * * Between 1937 and 1942, the figures fluctuated between about 140 and nearly 200. The rise since the end of World War II has been spectacular. * * * From a low of about 40 in 1945, the figure rose to almost 500 for the academic year 1951–52.

* * * Bachelor's degrees granted to physics majors rose steadily from the World War II low to a high of 3,400 in 1949–50, and then declined to 2,200 in 1951–52. Master's degrees granted in physics also rose rapidly to a high of about 1,000 in 1950–51, declining slightly in the next year to about 900. * * * the recent downward trend of degrees awarded at the bachelor's and master's levels may be expected to continue at least for the next few years. The number of doctoral degrees awarded, however, is likely to continue upward for several years.

A table showing the trend of job openings for physicists and the number of physicists who registered for employment as physicists with the American Institute of Physics is given below.[2] Since the institute is just one center for recruitment, these data cannot be used to measure the absolute level of demand, but only the direction of changes.

TABLE 1

	February 1950	February 1951	February 1952
Openings:			
Academic	78	85	74
Government	107	1,012	228
Industry	93	238	928
Institutional research	7	87	74
Total openings	285	1,422	1,304
Registrants:			
With doctorates	193	169	151
With other degrees	241	192	120
Total registrants	434	361	271

In an article, Trends in the Employment of College and University Graduates in Business and Industry, 1953,[3] tables are presented which the author states—

seems to indicate clearly that, in spite of the much-publicized shortage of graduating engineers, these reporting concerns will seek to employ still more technical men than were hired last year. The increase is about 25 percent. * * * Engineering educators have made the following estimates of the number of graduating engineers.

1949	46,000	1952	30,000	1955	22,000
1950	53,000	1953	23,000	1956	29,000
1951	42,000	1954	19,000		

It has been estimated that about 75 percent of the men who will graduate from colleges and universities this year have not had any military service. * * *

A survey made by the National Industrial Conference Board [4] of college recruitment in 1953, as reported to it by industrial companies, states:

Industry made a mad scramble for college seniors last year. This year, it appears, the scramble will be even more hectic.

The reasons for this * * * may be stated briefly.

There are fewer seniors. Fewer students will be graduating in 1953 than graduated in 1952. There are more underclassmen but fewer upperclassmen.

[2] A Policy for Scientific and Professional Manpower, p. 194.
[3] Journal of College Placement, vol. 13, No. 3, March 1953, p. 53.
[4] Management Record, vol. XV, No. 1, January 1953, p. 2.

The shortage of graduates in engineering this year will be especially acute. [A note to this statement is: "Industry could use 100,000 new engineers, according to the calculations of the manager of technical personnel in one of the country's largest electrical manufacturing companies."]

Fewer of the 1953 graduates will be available for private employment. It is said that only 1 in 4 of the male seniors across the country has completed his tour of military service.

More companies will be trying to recruit seniors. More companies than ever before are interested in employing college graduates; and their 1953 quotas, generally speaking, exceed the number of men recruited last year.

More colleges will be visited. In trying to reach their 1953 quotas, the college recruiters will extend their efforts to additional campuses. And the intensity of their recruiting efforts on each campus will be stepped up, too.

Last year a large majority of the companies failed to attain their quotas. This year, with the supply of seniors down and with the competition up, the chances that the companies will be any more successful are slim indeed.

But there is at least one bright spot in the picture. Many of the young men who were recruited 2 or 3 years ago and then were called by the armed services shortly after starting their jobs are now completing their period of duty. One company reports that it is getting 80 percent of its men back.

The 18th annual survey, June 1953, University and College Placements, of the Northwestern National Life Insurance Co., family economics bureau, as reported by educational institutions stated:

Once again, eager corporation scouts were knocking at the doors of most schools 1 or 2 months earlier than in recent postwar years. Some schools report that interviewing of June seniors began last October, right after registration. * * * The larger companies are interviewing men regardless of imminent military service; in many cases superior men are signed up even though they can work only 2 or 3 months before entering the Armed Forces, their seniority status to be maintained during their term of military duty. In response to the seemingly boundless market for engineers, freshman registrations showed another rise this year at most engineering schools, ranging from a modest gain to over 100 percent increase. Engineering placement officials report that alumni are taking advantage of the superabundance of good technical jobs to step up to better positions; placement departments have carried an unusually heavy load of alumni service this year.

Questioned as to the occupational field of most active employment demand, many placement officials find it difficult to particularize because the demand is so broad, coming from practically every major line of American business. For engineers and technicians, however, the major manufacturing industries offer the largest number of openings, particularly electronics, heavy machinery, metals, rubber, petroleum, automotive, textiles, chemicals, and aviation. Many engineering grads are taking positions with construction companies, public utilities, and in Government defense projects, in highway construction, and in other Federal and local government projects.

Starting Salaries for Scientists and Engineers

General Summary

Federal Government entrance rates in 1953 for inexperienced college graduates are generally below rates offered or paid to such graduates by private industry. Federal Government rates have remained the same since 1951 while the rates of private industry, which were not materially out of line with Federal rates up to 1951, advanced significantly in 1952 and again in 1953. Percentage increases in starting rates for inexperienced scientists and engineers with bachelor degrees have been equaled by percentages of increases in starting rates of college graduates in other fields. The rise appears to be general rather than restricted to scientists and engineers.

Starting rates for inexperienced scientists and engineers with bachelor degrees are higher than for other college graduates, higher in

manufacturing concerns than in nonmanufacturing concerns, higher in private organizations than in public organizations, higher in Atomic Energy Commission contractors than in other private organizations, and higher in the petroleum and aeronautical industries than in other industries. No clear pattern has evolved indicating significant geographical differences. Starting rates for inexperienced engineers with bachelor degrees are higher than for scientists of the same educational level. When compared to corresponding Federal Classification Act starting salaries, rates for inexperienced scientists and engineers with bachelor degrees are proportionately higher than for inexperienced scientists and engineers with doctor of philosophy degrees.

Classification Act salaries

Annual starting salaries for scientists and engineers in the Federal Government under the Classification Act of 1949, as amended, for 1949–50 and 1950–53 and the percentages of increase are:

TABLE 2

	1949–50	1951–53	Percent increase
Bachelor's degree: GS–5	$3,100	$3,410	10.0
Master's degree: GS–7	3,825	4,205	9.9
Doctor of philosophy degree:			
GS–9	4,600		
GS–11		5,940	29.0

These starting salaries can be compared with the information concerning starting salaries, secured from various sources, presented below.

Engineering salaries compared with other fields

Frank S. Endicott, director of placement, Northwestern University, has made, for a number of years, surveys of policy and practice in the employment of college and university graduates as reported by business and industrial companies. These studies are reported in the Journal of College Placement (and in its antecedent School and College Placement). The table below shows starting salaries for college graduates taken from these studies for 1949 through 1953.[5]

TABLE 3.—*Starting salaries for college graduates*

Field	Average starting salaries					Percent of increase in average starting rates		
	1953	1952	1951	1950	1949	1953 over 1952	1953 over 1951	1952 over 1951
Engineering	$3,900	$3,660	$3,240	$3,120	$3,132	6.6	20.4	13.0
Accounting	3,564	3,300	2,952	2,856	2,880	8.0	20.7	11.8
Sales	3,612	3,300	2,964	2,880	2,880	9.5	21.9	11.3
General: Business trainees	3,504	3,252	2,892	2,808	2,832	7.7	21.2	12.4
Average for all fields	3,648	3,396	3,012	2,940	2,940	7.4	21.1	12.7

In each of the years shown, the average starting salary for engineering graduates was higher than for graduates going into the other fields.

[5] Journal of College Placement, vol. 13, No. 3, March 1953; p. 53.

Average starting salaries for 1949 and 1950 were about the same; 1951 average starting salaries showed a small increase over 1950 salaries. Marked increases in average starting salaries are shown for 1952, ranging from 11.3 to 13 percent over 1951; and for 1953, ranging from 6.6 to 9.5 percent over 1952. Average starting salaries for 1953 range from 20.4 to 21.9 percent over average starting salaries for 1951.

The entrance salary for graduates with bachelor's degrees under the Federal Classification Act compared favorably with average starting salaries paid by business and industry in 1949, 1950, and 1951. In 1952 it compared favorably with average starting salaries for each field except engineering which was $250 a year (7.3 percent) more than the Classification Act entrance salary. In 1953, it is less than for each field; the engineering average starting salary is shown to be $490 a year (14.4 percent) more.

In a study conducted by the National Industrial Conference Board of salaries paid college graduates by private companies,[6] the following starting salaries were given:

TABLE 4

	1952	1953	Percent increase
Bachelor of arts graduates	$3,516	$3,696	5
Engineering graduates	3,708	4,008	8

These rates are slightly higher than those reported by Mr. Endicott. A more detailed analysis of beginning salaries for 1953 is reported as follows:

TABLE 5

Degree	Manufacturing companies			Nonmanufacturing companies		
	Average	Lowest	Highest	Average	Lowest	Highest
Regular bachelor of arts degree	$3,696	$3,000	$4,200	$3,252	$2,340	$3,900
Engineering	4,008	3,120	4,500	3,852	2,700	5,856
Master of arts degree	4,440	3,600	5,220	3,744	2,700	4,800
Doctor of philosophy degree	5,856	4,080	7,200		2,700	6,120

Corresponding Federal Classification Act entrance rates are within the range of salaries reported in each category but below all the average salaries except in the cases of the regular bachelor of arts and the master of arts degrees in nonmanufacturing companies, and the doctor of philosophy degree in manufacturing companies. Average starting salaries in manufacturing companies are 13.7 percent greater than the average starting salaries in nonmanufacturing companies for regular bachelor of arts, 4 percent greater for engineering graduates, and 18.6 percent greater for graduates with master's degrees.

Civil engineering salaries

The committee on salaries of the American Society of Civil Engineers secured data from employers of civil engineers during the period of March to May 1953.[7] For the lowest grade of civil engineer, corresponding to grade GS–5 of the Classification Act of 1949, as amended,

[6] Management Record, vol. XV, No. 1, January 1953, p. 2.
[7] Civil Engineering, July 1953, p. 50.

the study reports that during the 7-year period from 1939 to 1946, there was a substantially uniform increase in the starting salary at the rate of $177 per year. The increases during the next 5 years, until 1951, were at a lesser rate. For the most recent 2 years, 1952 and 1953, the trend has been upward at an average of approximately $300 per year. Minimum and maximum rates for this grade, as of March, April, and May 1953, are listed as follows:

TABLE 6

	Entrance rates			Maximum rates		
	Total range	Middle 50-percent range	Median rate	Total range	Middle 50-percent range	Median rate
Private organizations	$2,400–$5,000	$3,300–$4,132	$3,750	$2,912–$6,000	$3,900–$4,800	$4,356
Consultant firms	2,400– 5,000	3,120– 4,000	3,600	2,912– 6,000	3,800– 4,700	4,300
Construction firms	2,700– 4,500	3,200– 4,000	3,750	3,300– 5,400	3,900– 4,800	4,200
Public organizations	1,920– 4,296	2,760– 3,768	3,411	2,400– 5,560	3,540– 4,472	4,080
State highway departments	1,920– 4,296	2,640– 3,660	3,180	2,400– 5,560	3,360– 4,440	4,020

The scheduled entrance and maximum rates for the corresponding grade under the Classification Act of 1949, as amended, are $3,410 and $4,160. The Classification Act minimum rate is within the middle 50-percent range of entrance rates shown for inexperienced civil engineers, but below the middle entrance rates paid by private organizations. Similarly, the scheduled maximum rate is within the middle 50-percent range of maximum rates shown but below the middle maximum rate paid by private organizations.

Research and development scientist and engineer salaries

Surveys of salaries of professional scientific workers engaged in research and development have been conducted for a number of years by the Los Alamos Scientific Laboratory of the University of California. The following data on average salaries for scientists with bachelor of science degrees with less than 1 year of service since receiving their degrees were secured from the reports for 1949, 1950, 1951, and 1952.

TABLE 7

	1952	1951	1950	1949
All categories	$3,924	$3,516	$3,348	$3,312
Type of employer:				
Private industry	4,044	3,732	3,360	3,420
Government (Federal)	3,540	3,156	3,300	3,228
AEC contractors	4,176	3,924	3,636	3,504
Research institutions and consultants	3,684	3,348	2,988	3,096
Chemical	3,948	3,720	3,408	3,384
Petroleum	4,284	3,792	3,492	3,780
Instruments	4,080	3,828	3,324	3,504
Aeronautical	4,092	3,792	3,504	3,504
Machinery	3,984	3,312	3,180	3,756
Electronics	4,032	3,696	3,372	3,288
Rubber	3,972	3,612	3,168	3,276
Food	3,780	3,636	3,240	3,096
Biological and pharmaceutical	4,020	3,384	3,312	2,904
Other	4,032	3,756	3,348	3,300

The average entrance salaries for "All categories" indicates not much change in 1950 over 1949, a small rise in 1951 and a marked rise in 1952. The 1951 salary was 6.2 percent greater than for 1949. The 1952 salary was 11.6 percent greater than for 1951, and 18.5 percent greater than for 1949.

Data under the heading "Type of employer" show that research and development scientists working for AEC contractors got the highest beginning salaries; then in order came the salaries paid by private industry, by research institutions and consultants, and by the Federal Government. This pattern was consistent for all 4 years except with regard to salaries paid by research institutions and consultants and by the Federal Government in 1949 and 1950, when their positions are reversed. Comparing 1952 average beginning salaries with those for 1949, salaries paid by AEC contractors and by research institutions and consultants rose 19 percent, those paid by private industry rose 18 percent, and those paid by the Federal Government rose 10 percent. In 1952, the average beginning salary paid by AEC contractors was 18 percent greater than that paid by the Federal Government, for private industry it was 14 percent greater, and for research institutions and consultants it was 4 percent higher.

According to the figures shown under the heading "Industries," the petroleum industry paid inexperienced research and development scientists with bachelor of science degrees the highest beginning rates in 1952 and 1949 and the second highest rates in 1951 and 1950; the aeronautical industry paid the highest rate in 1950, the second highest rate in 1952, equaled the rate paid by the petroleum industry in 1951, and the third highest rate in 1949. Rates paid by the rubber and the food industries were consistently among the lowest. Comparing the data with the average rates for "Government (Federal)," shown under "Type of employer," all 1952 and 1951 industry rates were higher than the Government rates for those years; in 1950, the rates paid in the machinery, rubber, and food industries were lower than the Government rate, all others being higher; and in 1949, the rates paid in the food and the biological and pharmaceutical industries were lower than the Government rate, all others being higher. 1952 increases over 1949 rates ranged from 6.1 percent in the machinery industry to 38.4 percent in the biological and pharmaceutical industry; other increases were 22.6 percent in the electronic industry, 22.2 percent in the "Other" industries, 22.1 percent in the food industry, 21.2 percent in the rubber industry, 16.8 percent in the aeronautical industry, 16.7 percent in the chemical industry, 16.4 percent in the instruments industry, and 13.3 percent in the petroleum industry.

Chemist and chemical engineering salaries

Starting salaries of inexperienced chemist and chemical engineers were studied by the Americal Chemical Society in 1952 and 1953.[8] Data for 1952 were secured from companies using the American Chemical Society employment clearing house, whereas 1953 data were obtained directly from graduates rather than from employers. Comparative figures for the 2 years are shown below:

[8] Chemical and Engineering News, July 27, 1953.

TABLE 8.—*Starting salaries of inexperienced chemists*

	1953	1952	Percent increase
Bachelor's degree:			
1st decile salary [1]	$3,600	$3,336	8.0
Median salary [2]	4,212	3,900	
9th decile salary [3]	4,500	4,200	
Master degrees:			
1st decile salary	4,200	4,140	5.2
Median salary	4,848	4,608	
9th decile salary	5,280	5,040	
Doctor of philosophy degrees:			
1st decile salary	4,800	5,640	2.5
Median salary	6,300	6,144	
9th decile salary	6,780	6,384	

[1] 1st decile salary means the rate which equaled or exceeded the rates paid to 10 percent of the graduates who got the lowest rates.
[2] Median salary means the rate which equaled or exceeded the rates paid to 50 percent of the graduates.
[3] 9th decile salary means the rate which equaled or exceeded the rates paid to 90 percent of the graduates.

TABLE 9.—*Starting salaries of inexperienced chemical engineers*

	1953	1952	Percent increase
Bachelor degrees:			
1st decile salary	$4,080	$3,852	5.0
Median salary	4,320	4,116	
9th decile salary	4,680	4,404	
Master degrees:			
1st decile salary	4,380	4,296	3.8
Median salary	4,860	4,680	
9th decile salary	5,220	4,920	
Doctor of philosophy degrees:			
1st decile salary	6,000	6,000	5.5
Median salary	6,480	6,144	
9th decile salary	7,080	6,600	

Median starting salaries for inexperienced chemists in 1953, as compared to 1952 salaries, increased most for those with bachelor's degrees and least for those with doctor of philosophy degrees. Among chemical engineers, the increases for the two groups did not show the same trend; those with doctor of philosophy degrees were increased most and those with master's degrees increased least. The greatest percent was for inexperienced chemists with bachelor's degrees.

Entrance rates under the Classification Act of 1949, as amended, were within the range shown for chemists in 1952 but below the median rates. The same relationship is shown for chemists in 1953 except for chemists with bachelor's degrees. In this case, the Classification Act rate is below the first decile salary. With regard to entrance rates for inexperienced chemical engineers, the Classification Act rates were below the first decile salary in all three categories for both years.

Median starting salaries reported in the American Chemical Society study were greater than corresponding Classification Act starting salaries in the following percentages:

TABLE 10

	1953	1952
Chemists:	*Percent*	*Percent*
Bachelor's degrees	23.5	14.4
Master's degrees	15.3	9.6
Doctor of philosophy degrees	6.1	3.4
Chemical engineers:		
Bachelor's degrees	26.7	20.7
Master's degrees	15.6	11.3
Doctor of philosophy degrees	9.1	3.4

Salaries by geographical areas

Entrance salary rates for various geographical areas (U. S. Census regions) were analyzed in the studies of the Los Alamos Scientific Laboratory and the American Chemical Society. The following figures are taken from these surveys:

TABLE 11.—*Entrance salaries by United States census regions*

	New England	Middle Atlantic	South Atlantic	East North Central	East South Central	West North Central	West South Central	Mountain	Pacific
Chemists, 1953:									
With bachelor's degree	.....	$4,260	$4,224	$4,224	.....	$4,224	.....	.....	.....
With doctor of philosophy degree	.....	6,236	6,300	6,240	.....	.....	$6,336	.....	$6,120
Chemical engineers, 1953:									
With bachelor's degree	$4,224	4,224	4,260	4,320	$4,320	4,320	4,320	.....	4,440
Research and development scientists:									
1952	4,056	4,008	4,068	3,912	3,696	4,140	4,308	$4,188	4,068
1951	3,624	3,672	3,804	3,648	3,648	3,936	3,828	.....	3,780
1950	3,408	3,300	3,432	3,336	3,276	3,372	3,396	.....	3,444

No significant geographical differences in entrance salaries are indicated for chemists in 1953, although it may be of interest to note that doctor of philosophy degree chemists in the Pacific region have the lowest rate and the West South Central region the highest rate, the percentage difference being 3.5 percent. The highest rate among chemical engineers in 1953 is, however, in the Pacific region. The variations in rates of chemical engineers in 1953 is not significant among the other regions. The percent of the difference between the highest and the lowest rate is 5.1 percent.

The rates for research and development scientists in 1952 show all but the highest and the lowest rates in a narrow range between $3,912 and $4,188. The highest rate was in the West South Central region, $4,308. It is greater than the lowest rate of $3,696, in the East South Central region, by 16.6 percent. In 1951, the highest rate was in the West North Central region and the lowest in the New England region, a percentage difference of 8.6 percent. In 1950, the highest rate was in the Pacific region and the lowest in the East South Central region, a percentage difference of 5.1 percent.

Salary offers reported by educational institutions

The following information is quoted from a survey of entrance salaries in 1953 made by the family economics bureau of the Northwestern National Life Insurance Co. Information was secured from

universities, colleges, and technical schools. Salary figures are monthly rates. For comparison, the $3,410 yearly entrance rate for inexperienced graduates with bachelor's degrees under the Classification Act is $284 per month.

More employers competing for fewer college graduates have once again shoved starting salaries to new all-time peaks. Nearly all of the 131 universities, colleges, and technical schools cooperating in our 18th annual survey report starting salaries for inexperienced graduates to be up from last year's record levels, generally by around 10 percent. The 1953 averages reported by various schools run prevailingly between $290 and $310 a month for liberal arts men, $310–$330 for business administration majors, and $325–$375 for engineers, with some individuals starting at $400 for a 40-hour week, plus a premium for longer workweek.

Carnegie Institute of Technology: Last year the median starting salary was $325 per month, this year it is $350.

Harvard University (Graduate School of Engineering): Salary levels up about $300 per year for bachelor of art degree men and $500 a year for master of science degree men.

Massachusetts Institute of Technology: Starting salaries up $25 to $35 per month.

New York University: Minimum starting salaries about 10 percent higher, $330 for engineers, $275 to $300 for accountants.

Stevens Institute of Technology: Average starting salary will run at least $355 this year compared to $333 last year.

University of Akron (College of Engineering): Starting salaries for engineers average about $375 per month.

Illinois Institute of Technology: January class of engineers average $341; offers to June class are averaging somewhat higher.

Oklahoma Agricultural and Mechanical College (College of Engineering): Starting salary range now $340–$385, compared with $320–$350 last year.

University of Oklahoma (College of Engineering): Most starting salaries running $325–$400 a month for bachelor of science degree men.

University of Toledo: Starting salaries for engineering graduates last spring averaged $325 to $330 per month; this year most graduates are going at a minimum of $360, and some are getting $400.

Washington University (St. Louis) (School of Engineering): Starting salaries average $350 this year against $318 a year ago.

University of Florida: Salaries ranging $325 to $355 for engineers and technical help, $275 to $325 for business and liberal arts graduates.

Johns Hopkins University: Average salary range is $325–$350 and for engineers $350–$380 a month.

University of Kentucky (College of Engineering): Average offer running about $360 a month.

Louisiana State University (College of Engineering): Average salary accepted this year, $360; last year it was $340.

University of Maryland (College of Engineering): A minimum of $350 per month.

University of Richmond: Management trainees ranging from $260 to $416 a month; chemists from $325 to $425; sales $275 to $348.

Tulane University (College of Engineering): Average starting salary running about $350, compared with $335 a year ago.

Agricultural and Mechanical College of Texas: Public utilities offering salaries generally around $325 per month for bachelor of science degree men with no experience. Most oil companies are up from the $325–$355 bracket last year into the $350–$400 range.

California Institute of Technology (School of Engineering): Average running about $350 for bachelor of science degree men.

University of Idaho (College of Engineering): Starting salaries running about $340–$350.

University of New Mexico (College of Engineering): Starting salaries higher, in a range from $325 to $400 a month.

Oregon State College (School of Engineering): Average salary this year for bachelor of science degree men with no experience, $350.

University of Southern California (School of Engineering): Oil companies paying $355 a month for trainees against an average of $335 a year ago.

Texas Technological College: Companies which offered $335 to engineers last year are offering $350–$375 this year.

University of Texas (School of Engineering): Starting salaries with electric utilities are about $325 against $300 a year ago. Oil and chemical industries offer $375 compared with $355 last year. Manufacturing offers $350 compared with $325 a year ago.

University of Washington (College of Engineering): Average offer for bachelor of science degree man with no experience, $350 to $365 per month.

Salaries of Scientists and Engineers as Affected by Type of Employer

A number of studies have been made which enable a comparison of the salaries paid scientists and engineers by Government and by other types of employers, principally private industry and colleges and universities. These salary figures are based on actual earnings of scientists and engineers in the categories shown, regardless of the factors which generally underlie differences in pay. For example, salary data related to the number of years of experience in the profession do not take into account the fact that persons with the same number of years of experience may be in positions having varying levels of duties and responsibilities. The importance of the position usually accounts for differences in salary to a greater degree than the number of years since college graduation.

The most recent studies of salaries of scientists and engineers deal with salaries paid in 1952. Consequently, they do not show the effect of the advance in entrance salaries of inexperienced college graduates in 1953. Even the significant advance in entrance salaries of inexperienced scientists and chemists in 1952 may not have had sufficient time to influence the salaries of other scientists and engineers. As a result, the studies dealt with in this report concerning salaries and earnings must be related to the years to which the data refer and are not to be considered as representative of the situation existing in 1953.

GENERAL SUMMARY

Salaries paid scientists and engineers in Government generally compared favorably with those in educational institutions. In 1951, Government salaries fell definitely behind research-institution salaries for research and development scientists and engineers with doctor of philosophy degrees who had about 14 or more years of service after they received their bachelor degrees. In 1952, Government salaries were definitely lower than research institution salaries for research and development scientists and engineers with doctor of philosophy degrees who had more than 10 years of service after receiving their bachelor degrees. With regard to professional incomes of chemical engineers in 1951, Government salaries were considerably lower than those paid in educational institutions. In the case of full professional engineers, who were 35 years of age and over and members of engineering societies, incomes in 1949–50 in Government were below those in educational institutions for engineers with bachelor degrees but not below for those with master or doctor of philosophy degrees.

Salaries paid scientists and engineers in Government were generally below those paid in private industry at the entrance rate and for those with about 10 or more years of experience. Research and development scientists and engineers with bachelor degrees employed by Atomic Energy Commission contractors received much higher rates in 1951 at less than one (zero) and at 1 year after receiving their bachelor degrees and in 1952 at zero years after receiving their bachelor degrees, but thereafter Government salaries did not compare too unfavorably with AEC contractor salaries. Salaries paid in 1951 and 1952 to research and development scientists and engineers with doctor of philosophy degrees employed by Government did not compare too unfavorably with salaries paid by Atomic Energy Commission contractors and by private industry during the early part of their careers, but were considerably lower than AEC contractor and private industry salaries at about 10 or more years since receiving their bachelor degrees.

Research and development scientist and engineer salaries, 1949–52

The Los Alamos Scientific Laboratory of the University of California conducted a study dealing with salaries for professional scientific workers engaged in research and development. Figures presented here are taken from study reports for the years 1949, 1950, 1951, and 1952, and cover salaries for scientists with bachelor degrees and scientists with doctor of philosophy degrees.

Table 12 shows the average monthly salaries in dollars paid research and development scientists and engineers with bachelor degrees.

TABLE 12.—*Average monthly salaries of research and development scientists and engineers with bachelor degrees*

Years since receiving bachelor of science degree	Federal Government				Private industry				Atomic Energy Commission contractors				Research institutions and consultants			
	1952	1951	1950	1949	1952	1951	1950	1949	1952	1951	1950	1949	1952	1951	1950	1949
0	$295	$263	$275	$269	$337	$311	$280	$285	$348	$327	$303	$292	$307	$279	$249	$258
1	341	284	296	282	363	326	305	304	363	350	316	321	339	298	278	269
2	369	325	325	336	387	354	333	330	393	365	351	343	360	333	287	307
3	405	358	356	331	411	383	356	336	421	402	375	350	388	337	334	320
4	437	387	370	368	441	407	364	349	439	423	382	349	421	386	329	317
5	453	395	386	372	466	413	373	368	462	433	378	390	449	380	335	357
6	469	412	405	399	484	424	389	387	489	437	396	408	468	421	371	379
7	468	432	430	409	496	441	410	411	469	449	424	394	472	442	396	404
8	515	452	461	417	509	466	432	437	499	485	438	424	499	441	426	412
9	531	476	490	449	531	488	455	452	544	495	451	426	519	489	432	427
10	552	481	472	450	551	507	473	466	542	508	463	445	556	483	441	433
11	554	489	471	452	570	531	488	479	551	518	493	438	556	508	463	466
12	566	493	486	437	594	544	505	498	572	539	510	465	575	511	472	486
13	560	491	475	443	606	562	516	508	587	554	505	484	536	508	496	475
14	572	484	470	457	629	572	530	517	582	555	539	474	557	536	506	475
15	566	481	489	465	639	585	546	514	594	565	533	473	607	573	527	500
16	545	497	506	475	648	598	544	517	605	561	529	455	621	561	569	519
17	565	503	516	476	673	589	543	508	593	582	525	445	626	622	536	509
18	588	519	519	472	652	579	540	522	620	519	567	471	609	583	521	503
19	577	540	504	494	648	578	571	590	588	559	504	436	675	605	534	555
20	602	522	543	526	640	595	612	596	591	557	505	580	653	548	556	557
Over 20	587	525	520	507	764	704	666	670	638	597	604	490	638	645	633	608

From the data in table 12, the percent of the salaries paid by private industry, Atomic Energy Commission contractors, and research institutions and consultants, as compared with Government salaries was computed. These percentage figures are presented in table 13.

TABLE 13.—*Percent of salaried paid research and development scientists and engineers with bachelor degrees by private industry, Atomic Energy Commission contractors, and research institutions and consultants, compared with Government salaries*

[Government salaries are 100 percent]

Years since receiving bachelor of science degree	Percentages in 1952			Percentages in 1951			Percentages in 1950			Percentages in 1949		
	Private industry	AEC contractors	Research institutions	Private industry	AEC contractors	Research institutions	Private industry	AEC contractors	Research institutions	Private industry	AEC contractors	Research institutions
0	114	118	104	118	124	106	102	110	91	106	109	96
1	106	106	99	115	123	105	103	107	94	108	114	95
2	105	107	98	109	112	102	102	108	88	98	102	91
3	101	104	96	107	112	94	100	105	94	102	106	97
4	101	100	96	105	109	100	98	103	89	95	95	86
5	103	102	99	105	110	96	97	98	87	99	105	96
6	103	104	100	103	106	102	96	98	92	97	102	95
7	106	100	101	102	104	102	95	99	92	100	96	99
8	99	97	97	103	107	98	94	95	92	105	102	99
9	100	102	98	103	104	103	99	98	94	101	95	95
10	100	98	101	105	106	100	100	98	93	104	99	96
11	103	99	100	109	106	104	104	105	98	106	97	103
12	105	101	102	110	109	104	104	105	97	114	105	111
13	108	105	96	114	113	103	109	106	104	115	109	107
14	110	102	97	118	115	111	113	115	108	113	104	104
15	113	105	107	122	117	119	112	109	108	111	102	108
16	119	111	114	120	113	113	108	105	112	109	96	109
17	119	105	111	117	116	124	105	102	104	107	93	107
18	111	105	104	112	100	112	104	109	100	111	100	107
19	112	102	117	107	104	112	113	100	106	119	88	112
20	106	98	108	114	107	105	113	93	102	113	110	106
Over 20	130	109	109	134	114	123	128	116	122	132	97	120

The percentage comparison of average salaries paid research and development scientists and engineers with bachelor degrees in the Federal Government with the average salaries paid by other types of employers, as shown in table 13, indicates that in 1952—

(*a*) Average private-industry salaries were 14 percent higher than average Government salaries at zero years since receipt of the bachelor degree; ranged from 1 percent lower (8 years) to 8 percent higher (13 years) for the period from the 1st through the 13th years and for the 20th year; ranged from 10 percent higher (14 years) to 19 percent higher (16 and 17 years) for the period from the 14th through the 19th year; and were 30 percent higher for over 20 years. Private-industry salaries were 10 percent, or less, higher than Government salaries from the 1st year through the 14th year, and at 20 years.

(*b*) Average AEC contractor salaries were 18 percent higher than average Government salaries at zero years since receipt of the bachelor degree; ranged from 3 percent lower (8 years) to 11 percent higher (16 years) for the remaining years. Average AEC contractor salaries were less than 10 percent higher than average Government salaries for all years except the 1st and the 16th year, and were equal to or lower than the Government salaries in the 4th, 7th, 8th, 10th, 11th, and 20th years.

(*c*) Average research institutions and consultants salaries ranged from 4 percent lower (3, 4, and 13 years) to 17 percent higher (19 years) than Government salaries for all years. They were equal to or less than Government salaries in the 2d through the 6th, 8th, 9th, 11th, 13th, and 14th years; and less than 10 percent higher than Government salaries in all years except the 16th, 17th, and 19th years.

Table 14 shows the average monthly salaries in dollars paid research and development scientists and engineers with doctor of philosophy degrees.

TABLE 14.—*Average monthly salaries of research and development scientists and engineers with doctor of philosophy degrees*

Years since receiving bachelor of science degree	Federal Government				Private industry				Atomic Energy Commission contractors				Research institutions and consultants			
	1952	1951	1950	1949	1952	1951	1950	1949	1952	1951	1950	1949	1952	1951	1950	1949
0																
1																
2			$550	$436	$500	$506	$463	$475		$530						
3	$526	$548	450	520	546	499	453	448	$492	447	$432	$486	$487	$457	$445	
4	488	464	402	389	538	463	455	453	503	473	459	427	510	492		$413
5	517	467	446	450	543	478	471	470	527	512	446	445	541	568	400	501
6	536	521	425	399	561	513	479	482	557	498	464	452	506	453	466	460
7	519	487	494	449	569	526	486	500	543	506	474	473	534	503	494	456
8	550	526	488	495	579	535	517	520	574	540	495	505	524	540	467	477
9	563	509	473	492	591	564	525	539	597	556	517	515	626	527	495	509
10	575	553	512	527	625	590	557	557	616	580	546	556	585	541	533	528
11	556	554	525	535	647	624	576	573	642	596	580	586	600	593	538	536
12	593	533	580	512	682	642	581	588	665	663	612	593	671	588	573	580
13	574	603	516	555	689	658	603	611	731	698	690	571	684	596	568	533
14	608	527	561	587	715	684	635	632	733	689	548	587	671	680	577	564
15	591	564	576	582	737	701	648	628	738	723	621	609	698	656	565	644
16	640	564	558	573	748	698	646	636	797	685	650	650	728	642	662	605
17	665	591	567	567	772	716	669	637	749	684	746	620	811	697	623	607
18	665	613	583	598	759	737	672	677	727	790	653	660	724	692	656	621
19	691	583	591	580	795	750	696	676	815	742	625	636	815	682	667	693
20	672	591	595	628	795	759	724	698	792	724	667	605	789	732	728	707
Over 20	684	615	607	591	842	804	743	736	810	757	744	711	781	774	766	687

From the data in table 14, the percent of the salaries paid by private industry, Atomic Energy Commission contractors, and research institutions and consultants, as compared with Government salaries was computed. These percentage figures are presented in table 15.

TABLE 15.—*Percent of salaries paid research and development scientists and engineers with doctor of philosophy degrees by private industry, Atomic Energy Commission contractors, and research institutions and consultants, compared with Government salaries*

[Government salaries are 100 percent]

Years since receiving bachelor of science degree	Percentages in 1952			Percentages in 1951			Percentages in 1950			Percentages in 1949		
	Private industry	AEC contractors	Research institutions	Private industry	AEC contractors	Research institutions	Private industry	AEC contractors	Research institutions	Private industry	AEC contractors	Research institutions
0												
1												
2							84			109		
3	104	94	93	91	82	83	101	96	99	86	93	
4	110	103	105	100	102	106	113	114		116	110	106
5	105	102	105	102	110	122	106	100	90	104	99	111
6	105	104	94	98	96	87	113	109	110	121	113	115
7	110	105	103	108	104	103	98	96	100	111	105	102
8	105	104	95	102	103	103	106	101	96	105	102	96
9	105	106	111	111	109	104	111	109	105	110	105	103
10	109	107	102	107	105	98	109	107	104	106	106	100
11	116	115	108	113	108	107	110	110	102	107	110	100
12	115	112	113	120	124	110	100	106	99	115	116	113
13	120	127	119	109	116	99	117	116	110	110	103	96
14	118	121	110	130	131	129	113	98	103	108	100	96
15	125	125	118	124	128	116	113	108	98	108	105	111
16	117	123	114	124	121	114	116	116	119	111	113	106
17	116	113	122	121	116	118	118	132	110	112	109	107
18	114	109	109	120	129	113	115	112	113	113	110	104
19	115	118	118	129	127	117	118	106	113	117	110	119
20	118	118	117	128	123	124	122	112	122	110	96	113
Over 20	123	118	114	131	123	126	122	123	126	125	120	116

The percentage comparison of average salaries paid research and development scientists and engineers with doctor of philosophy degrees in the Federal Government with the average salaries paid by other types of employers, as shown in table 15, indicates that in 1952:

(*a*) Average salaries paid by private industry ranged from 4 percent above (3 years since receiving bachelor of science degree) average Government salaries to 25 percent above (15 years). They were 10 percent or less above average Government salaries from 3 through 10 years since receiving bachelor of science degree; and 20 percent or more above at 13, 15, and over 20 years.

(*b*) Average salaries paid by AEC contractors were below average Government salaries at 3 years since receiving bachelor of science degree (6 percent below). In the other years, they ranged from 2 percent above (5 years) to 27 percent above (13 years). They were 10 percent or less above average Government salaries from 4 through 10, and at 18 years since receiving bachelor of science degree; and more than 20 percent above from 13 through 16 years.

(*c*) Average salaries paid by research institutions and consultants were below average Government salaries at 3 (7 percent below), 6 (6 percent below), and 8 (5 percent below) years since receiving bachelor of science degree. In the other years, they ranged from 2 percent above (10 years) to 22 percent above (17 years). They were 10 percent, or less, above average Government salaries at 4, 5, 7, 10, 11, 14, and 18 years since receiving bachelor of science degree; and more than 20 percent above at 17 years since receiving bachelor of science degree.

INCOMES OF MEMBERS OF THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS, 1952

The National Society of Professional Engineers conducted a survey of 1952 earnings of its members, all of whom are registered under State engineering registration laws. The information presented in table 16, below, was taken from the report of that survey.

Earnings of engineers in the Federal Government were definitely below earnings of engineers in private industry, in private practice, in contractor companies and in the "Other" group of employers. They were definitely above earnings of engineers in county or municipal and in State-government services.

When compared to earnings of engineers in public utilities and in education, earnings in the Federal Government did not fall definitely behind until the group of engineers who entered the profession in 1922 or earlier are reached.

According to the overall figures, earnings of engineers in the Federal Government compared favorably with earnings in public utilities and in education at the lower half of the range of earnings but fell behind in the upper half of the range.

Comparing median earnings of engineers in 1952 with the median earnings in the Federal Government, earnings in private industry were 15 percent higher; earnings in public utilities were 1 percent higher; earnings in county or municipal governments were 14 percent lower, earnings in State governments were 11 percent lower; earnings in education were 4 percent higher; earnings in private practice were

33 percent higher; earnings in contractor companies were 36 percent higher; and earnings in other companies were 12 percent higher.

TABLE 16.—*1952 incomes of members of the National Society of Professional Engineers, according to type of employer—Median income*

Year of entry into profession	Industry	Public utilities	Federal Government	County or municipal government	State government	Education	Private practice	Contractor	Other
1952	$4,500	[1] $4,570	[1] $4,180	[1] $4,320	[1] $5,300	[1] $5,080	[1] $5,130	[1] $5,420	[1] $4,940
1951	4,750								
1950	5,040	4,160	4,660		4,270		5,110	5,300	
1949	5,310	4,830	(1)		4,540		5,440	6,130	
1948	5,970	5,180	5,630	[1] 5,380	4,900	[1] 5,690	5,930	7,130	[1] 6,420
1947	6,130	5,450	(1)		[1] 5,310		6,380	7,380	
1945–46	6,470	5,850	(1)	[1] 5,670			7,250	8,080	
1943–44	7,310	6,150	6,440		5,800	5,830	6,950	8,690	[1] 7,100
1941–42	7,330	6,380	6,470	5,880	5,690	6,560	8,130	9,560	
1938–40	8,110	6,750	7,180	5,920	5,940	6,750	8,590	9,730	7,800
1933–37	9,330	7,120	7,680	6,390	6,270	7,640	10,000	10,640	8,750
1929–32	9,790	7,830	7,470	7,310	6,510	8,000	10,900	12,500	8,440
1923–28	10,340	8,500	8,710	6,710	6,690	8,030	12,190	10,950	10,500
1919–22	10,060	9,210	7,920	7,030	7,230	8,800	14,000	13,070	10,670
1913–18	10,970	8,690	8,210	7,160	6,980	9,250	13,830	13,000	9,130
1912 and before	10,800	9,920	7,630	6,480	6,870	7,500	11,050	16,200	9,500
Overall:									
Lower decile	5,280	5,030	5,100	4,630	4,750	4,920	5,300	5,880	5,040
Lower quartile	6,530	6,040	6,070	5,380	5,450	5,990	6,860	7,370	6,400
Median	8,420	7,400	7,300	6,300	6,490	7,590	9,690	9,920	8,160
Upper quartile	11,620	9,740	8,640	7,420	7,810	9,480	15,720	15,310	11,420
Upper decile	17,540	13,690	9,950	8,860	9,780	11,760	26,660	25,670	17,570

[1] Median not computed for year.

Incomes of physicists, 1951

Professional income in 1951 of physicists who were members of professional societies was studied jointly by the Bureau of Labor Statistics, United States Department of Labor, and the Office of Education, Federal Security Agency (now the Department of Health, Education, and Welfare).[9] The following table contains data taken from this study:

TABLE 17.—*Professional income of physicists in 1951*

	Total			Bachelor degrees			Master degrees			Doctor of philosophy degrees		
	M	1st Q	3d Q	M	1st Q	3d Q	M	1st Q	3d Q	M	1st Q	3d Q
Colleges and universities	$5,600	$4,400	$7,200	$4,000	$3,300	$5,200	$4,500	$3,700	$5,500	$6,400	$5,100	$8,000
Government	6,300	4,700	7,800	5,000	3,800	6,400	6,000	4,800	7,100	8,000	7,000	9,800
Private industry	7,000	5,400	9,500	5,800	4,300	8,300	6,400	5,200	8,400	8,000	6,700	10,800

NOTE.—M means median income—the amount which equals or exceeds the incomes of half the physicists in the study.
1st Q means the 1st quartile—the amount which equals or exceeds the incomes of the lowest quarter of the physicists in the study.
3d Q means the 3d quartile—the amount which equals or exceeds the incomes of ¾ of the physicists in the study.

According to the above table, the income of physicists in Government in 1951 was greater than the income of physicists in colleges and universities. Comparing the median figures, incomes of physicists in colleges and universities were 11 percent below the Government incomes as a whole, 20 percent below for physicists with bachelor de-

[9] Manpower Resources in Physics, 1951. Published by National Scientific Register as Scientific Manpower Series No. 3, Federal Security Agency, Office of Education.

grees, 25 percent below for physicists with master degrees, and 20 percent below for physicists with doctor of philosophy degrees.

Income of physicists in Government were below the incomes of physicists in private industry, except with regard to the median income of physicists with doctor of philosophy degrees where the incomes were the same and in the first quartile for physicists with doctor of philosophy degrees where the Government income was greater than the private-industry income. Comparing the median figures, private-industry incomes were 11 percent greater than Government incomes as a whole, 16 percent greater for those with bachelor degrees, and 7 percent greater for those with master degrees.

Incomes of chemists and chemical engineers, 1951

Professional income in 1951 of chemists was surveyed by the National Scientific Register, with the cooperation of the American Chemical Society.[10]

The following table contains data taken from this study.

TABLE 18.—*Professional income of chemists in 1951* [1]

	Total			Bachelor degrees			Master degrees			Doctor of philosophy degrees		
	M	1st Q	3d Q	M	1st Q	3d Q	M	1st Q	3d Q	M	1st Q	3d Q
Colleges and universities	$4,900	$3,800	$6,300	$3,400	$2,100	$4,200	$4,000	$3,300	$4,900	$5,600	$4,600	$7,000
Government	5,000	3,900	6,300	4,400	3,600	5,600	5,100	4,200	6,100	6,700	5,600	8,000
Private industry	5,800	4,400	7,800	5,100	4,000	6,900	5,900	4,700	7,700	7,900	6,500	10,900

[1] See footnote 1, table 17.

According to the above table, the income of chemists in Government in 1951 was greater than the income of chemists in colleges and universities, except with regard to the total third quartile income where they are the same. Comparing the median figures, incomes of chemists in colleges and universities were 2 percent below the Government incomes as a whole, 23 percent below for chemists with bachelor degrees, 22 percent below for chemists with master degrees, and 16 percent below for chemists with doctor of philosophy degrees.

Incomes of chemists in Government were below the incomes of chemists in private industry. Comparing the median figures, private industry incomes were 16 percent greater than Government incomes as a whole, 16 percent greater for those with bachelor degrees, 16 percent greater for those with master degrees, and 18 percent greater for those with doctor of philosophy degrees.

The same survey included information concerning the income of chemical engineers in 1951. The following information was taken from this survey.

TABLE 19.—*Professional income of chemical engineers in 1951*

	Median	1st quartile	3d quartile
Colleges and universities	$6,100	$4,700	$8,400
Government	5,000	4,000	6,300
Private industry	5,700	4,500	7,400

[10] Manpower Resources in Chemistry and Chemical Engineering, Bull. No. 1132, Bureau of Labor Statistics, U. S. Department of Labor.

According to the preceding table, incomes of chemical engineers in 1951 were highest in colleges and universities and lowest in Government. Comparing the medians, private-industry incomes for chemical engineers were 14 percent greater than for those in Government, and colleges and universities incomes were 22 percent greater than for those in Government.

Incomes of senior engineers, 1949–50

The Bureau of Labor Statistics of the United States Department of Labor has published a survey of engineering-society members of full professional grade, 35 years and over, based on a survey made by the Engineers Joint Council.[11] The following information concerning incomes of such engineers in 1949–50 is taken from this study. The incomes include salaries, fees, and royalties.

TABLE 20[1]

	Total			Bachelor degrees			Master degrees			Doctor of philosophy degrees		
	M	1st Q	3d Q	M	1st Q	3d Q	M	1st Q	3d Q	M	1st Q	3d Q
Educational institution	$7,100	$5,800	$8,900	$6,700	$5,300	$8,500	$6,900	$5,700	$8,600	$8,300	$6,600	$10,400
Government	6,600	5,400	8,100	6,500	5,500	8,000	7,200	6,000	8,600	8,700	7,400	10,200
Private industry	8,400	6,500	11,400	8,400	6,500	11,300	8,900	7,100	11,900	10,900	8,200	16,300

[1] See footnote 1, table 17.

According to the above table, the incomes of engineers in Government in 1949–50 were less than the incomes of engineers in educational institutions, except with regard to the first quartile income of engineers with bachelor degrees, incomes of engineers with master degrees, and median and first quartile incomes of engineers with doctor of philosophy degrees. Comparing the medians, incomes of engineers in educational institutions were 8 percent above the Government incomes as a whole, 3 percent above for engineers with bachelor degrees, 4 percent below for those with master degrees, and 5 percent below for those with doctor of philosophy degrees.

Incomes of engineers in Government were below the incomes of engineers in private industry. Comparing the median figures, private-industry incomes were 27 percent greater that Government incomes as a whole, 29 percent greater for those with bachelor degrees, 24 percent greater for those with master degrees, and 25 percent greater for those with doctor of philosophy degrees.

Salaries of doctor of philosophy degree scientists, 1949

Dr. M. H. Trytton, Director of the Office of Scientific Personnel of the National Research Council, reports [12] that—

> in 1949 the average salary paid to scientists with doctor of philosophy degrees was $7,070 in industry, $6,280 in Government, and only $4,860 in educational institutions.

According to these figures, scientists in private industry received 13 percent more than scientists in Government in 1949, and scientists in educational institutions received 23 percent less than scientists in Government.

[11] Employment, Education, and Income of Engineers, 1949–50, U. S. Department of Labor, Bureau of Labor Statistics.
[12] Scientists, Scientific American, September 1951, p. 71.

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